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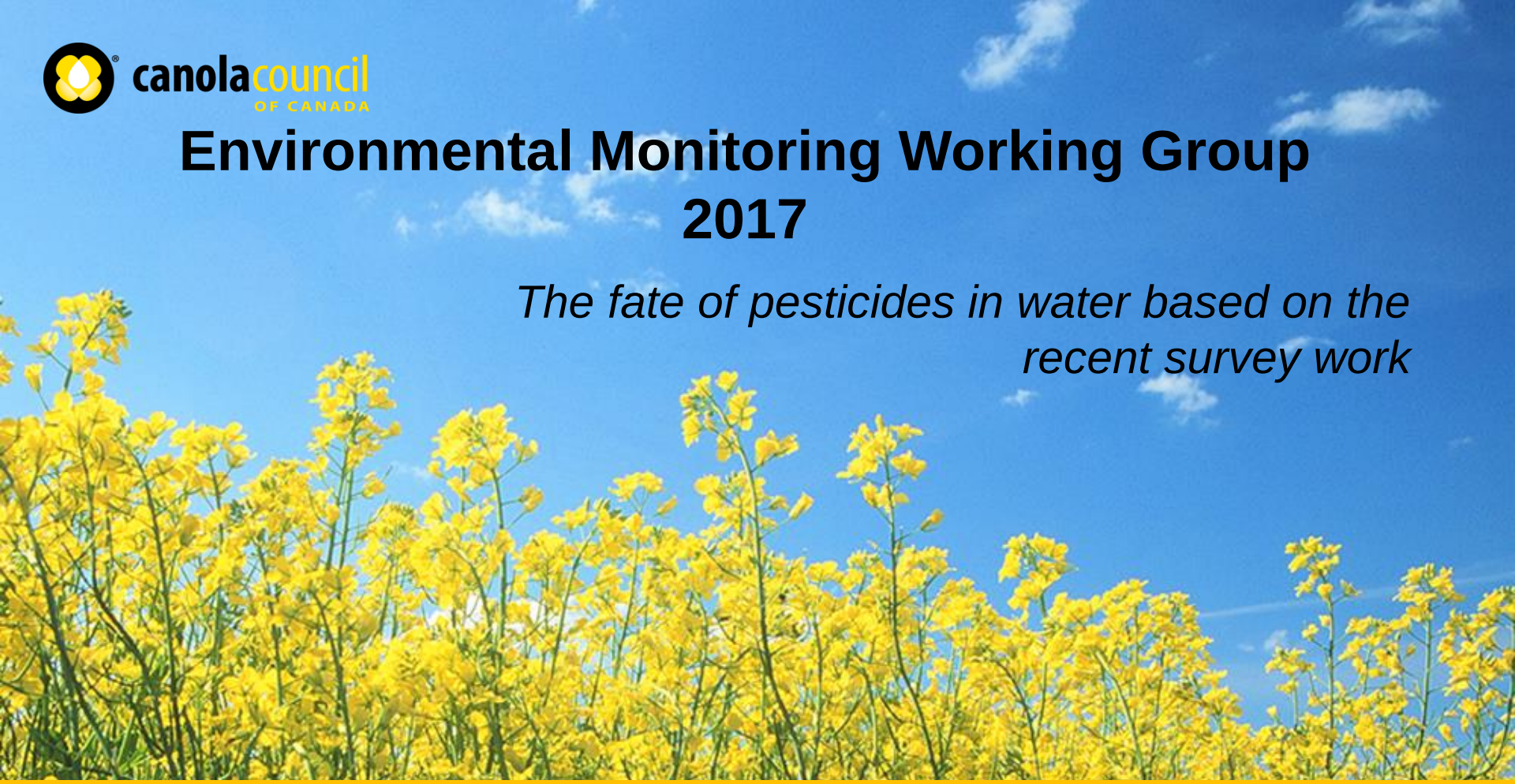
Environmental Monitoring Working Group 2017

The fate of pesticides in water based on the recent survey work



52 BY 2025

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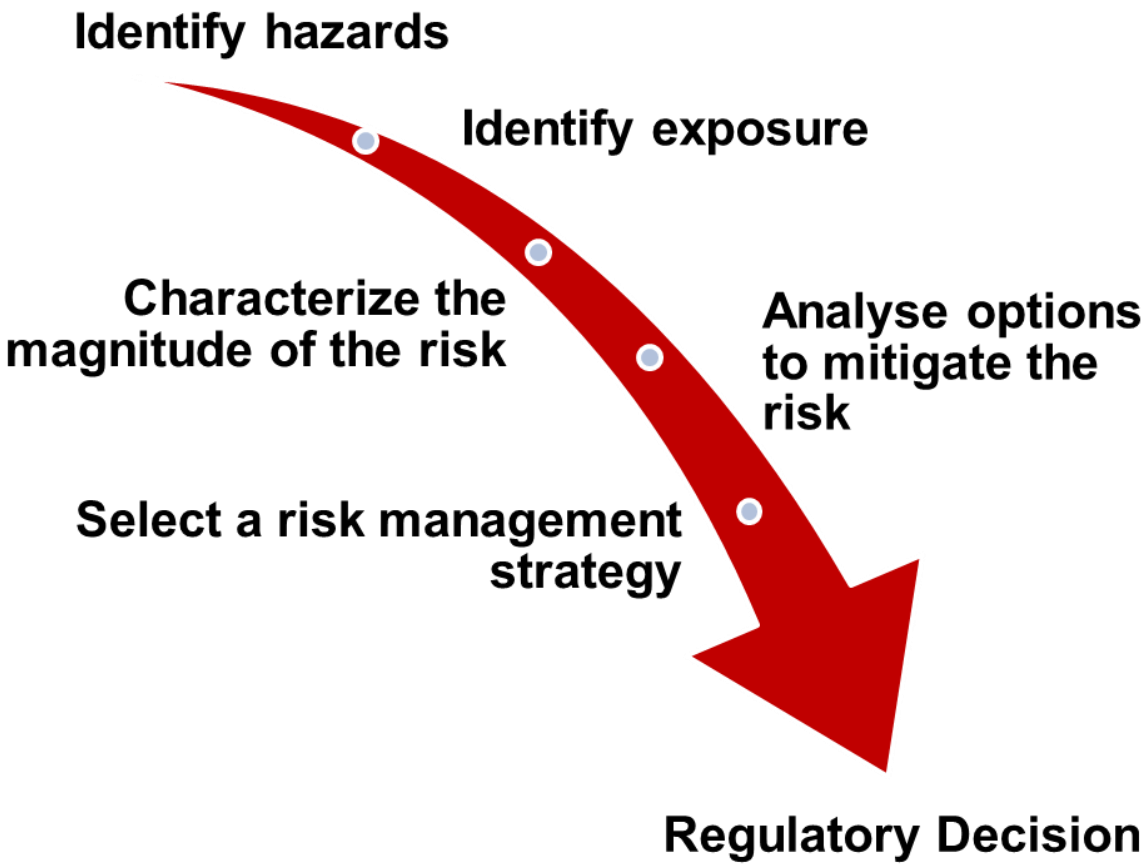
Pest Control Products Act (PCPA)

- Health Canada's Pest Management Regulatory Agency (PMRA) is responsible for the regulation of pest control products in Canada under the authority of the *Pest Control Products Act* (PCPA).

- The primary objective is to prevent unacceptable risks to people and the environment from the use of pest control products.

- All registered pesticides must be re-evaluated by the PMRA on a cyclical basis to make sure they continue to meet modern health and environment safety standards and continue to have value.

Risk Assessment and Management



Risk Characterization – Tiered Approach

- Screening Level Risk Assessment
  - Goal to identify:
    - Pesticides that do not pose a concern
    - Group(s) of organisms that would not be at risk
    - Pesticides that have a potential for concern, and risk needs further characterization
  - Based on conservative scenarios, simple methods

- Higher Tiered Risk Assessment
  - Goal: further characterize the risk using more realistic scenarios
  - Risks from spray drift and runoff are assessed separately
  - Runoff is assessed based on water modelling
  - Monitoring data are considered, when available

Environmental Fate of Imidacloprid

- Persistence
  - Imidacloprid can persist in terrestrial and aquatic systems.
    - Terrestrial DT_{50}: 157 to 973 days in laboratory studies and 22 to 426 days in field studies
    - Aquatic total system DT_{50}: 30 to 159 days under aerobic conditions and about 27 days under anaerobic conditions
  - Accumulation in soil over time has been observed until a plateau is reached after about 3 years of use.
  - In aquatic systems, imidacloprid can transform rapidly in sunlight; however, this would be limited to clear shallow water bodies.
- Mobility
  - Highly soluble in water
  - Medium to high potential for mobility in soil
  - Frequent detection in surface water and groundwater based on monitoring data
- Bioaccumulation
  - Not likely to accumulate in the tissues of organisms (e.g., fish)

Human Health Risk Assessment

- No human health risks of concern were identified for any of the following exposure scenarios:
  - Diet (food and water);
  - Applying the pesticide at home, or coming into contact with the pesticide after it has been applied; or
  - Applying the pesticide to agricultural crops or seeds, or coming into contact with the pesticide after it has been applied.

Terrestrial Risk Assessment

- Soil dwelling organisms
  - Imidacloprid use is not expected to pose a risk to earthworms.
  - Limited field data indicate risk to other soil dwelling organisms.

- Beneficial arthropods
  - Foliar uses of imidacloprid are expected to pose a risk to beneficial arthropods (on field and adjacent to treated fields from spray drift).
  - Limited field data indicate that other non-foliar uses (granular and seed treatments) may also pose a risk.

- Plants
  - Imidacloprid use is not expected to pose a risk to terrestrial plants.

Terrestrial Risk Assessment – Birds and Mammals

- Foliar spray
  - Imidacloprid may pose an acute and reproductive risk to small birds feeding on insects at the highest foliar use rates.

- Seed treatments
  - Ingestion of treated seed may pose an acute and reproductive risk to birds and small mammals.

  - For most treated seeds, the number of seeds needing to be consumed to elicit intoxication may be extremely small (<1 seed to up to 5 seeds).

  - There is uncertainty whether or not certain treated seeds would be an attractive food source for birds and mammals.

Terrestrial Risk Assessment – Birds and Mammals

- Commercial granular formulations for turf
  - Exposure to imidacloprid from ingestion of granules may pose a risk to birds.
  - Because granular imidacloprid products are watered in after application, the potential exposure period for which birds would have an opportunity to ingest a harmful amount of granules is expected to be of short duration.
  - Current labels for commercial granular products require irrigation or rainfall within 24 hours of application of granules.

Aquatic Risk Assessment

- Use of imidacloprid is not expected to pose a risk to:
  - Aquatic plants
  - Freshwater or marine fish
  - Amphibians
  - Algae

- Acute and chronic risks were identified for aquatic invertebrates.

Environmental Monitoring Working Group (EMWG) Mandate

- November 23, 2016, Health Canada's Pest Management Regulatory Agency (PMRA) released Proposed Re-evaluation Decision PRVD2016-20, recommending a phase out of *Imidacloprid*, citing acute and chronic risks to aquatic invertebrates.

- As part of an industry-wide collaborative consultation process, Agriculture and Agri-food Canada (AAFC) convened an initial multi-stakeholder forum for various levels of government and affected stakeholders, on December 21, 2016. The Environmental Monitoring Working Group (EMWG) was struck as part of that initial meeting.

- 2 additional working groups established at this time – Risk Mitigation & Alternative Use Chemistries.

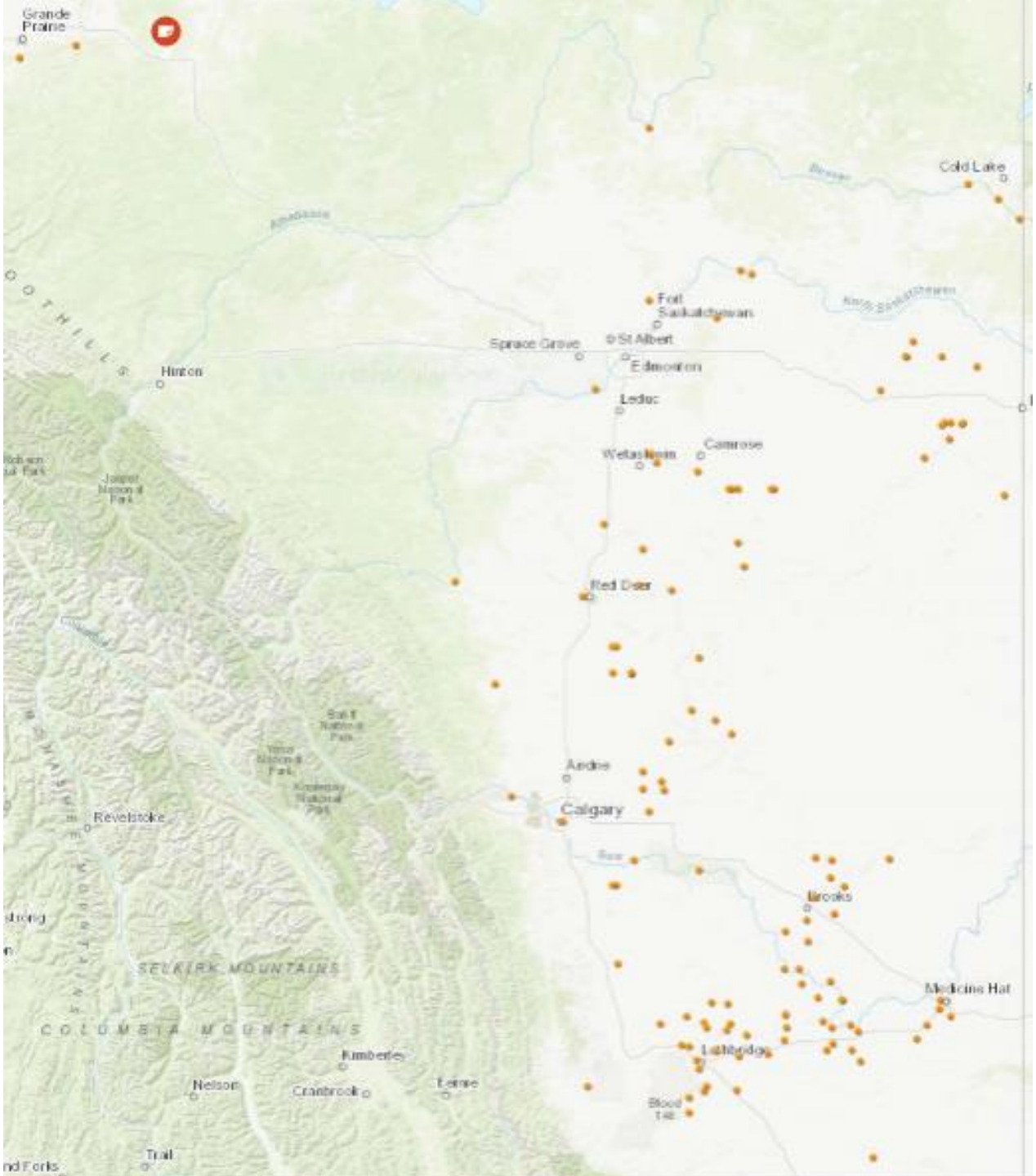
Environmental Monitoring Working Group (EMWG) Mandate

- January 2017, the PMRA provided the EMWG with parameters that needed to be addressed in order to generate scientifically robust environmental water monitoring data. The generation of this data was quickly identified as the main focus area of the EMWG.

- Specifically, the EMWG's tasks were to (i) undertake data analysis and gap identification; (ii) develop and implement an environmental water monitoring strategy to address identified gaps; (iii) identify sources of imidacloprid, clothianidin, and thiamethoxam that exceeded or approached threshold levels demonstrated to cause harm to aquatic invertebrates, and; (iv) explore the establishment of a long-term Pan-Canadian agri-environmental monitoring program.

Neonicotinoid Water Monitoring 2017

- Requirement: Coordinated water monitoring / sample collection plan across Canada throughout the growing season. Determine levels of the 3 neonicotinoid insecticides in waterways, wetlands over growing season.
- EMWG enrolled provincial water monitoring agencies – Agriculture, Environment, Parks and Environment and Climate Change Canada – with various jurisdictions to coordinate water monitoring from BC to ON & PEI.
- Covered flowing water / watersheds of all major watersheds.
- Wetlands – not under provincial/federal jurisdiction. CCC engaged Ducks Unlimited Canada to conduct wetland monitoring.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Kootenay National Park
Yoho National Park
Revelstoke
Airdrie
Calgary
Brooks
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Lethbridge
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Kimberley
Nelson
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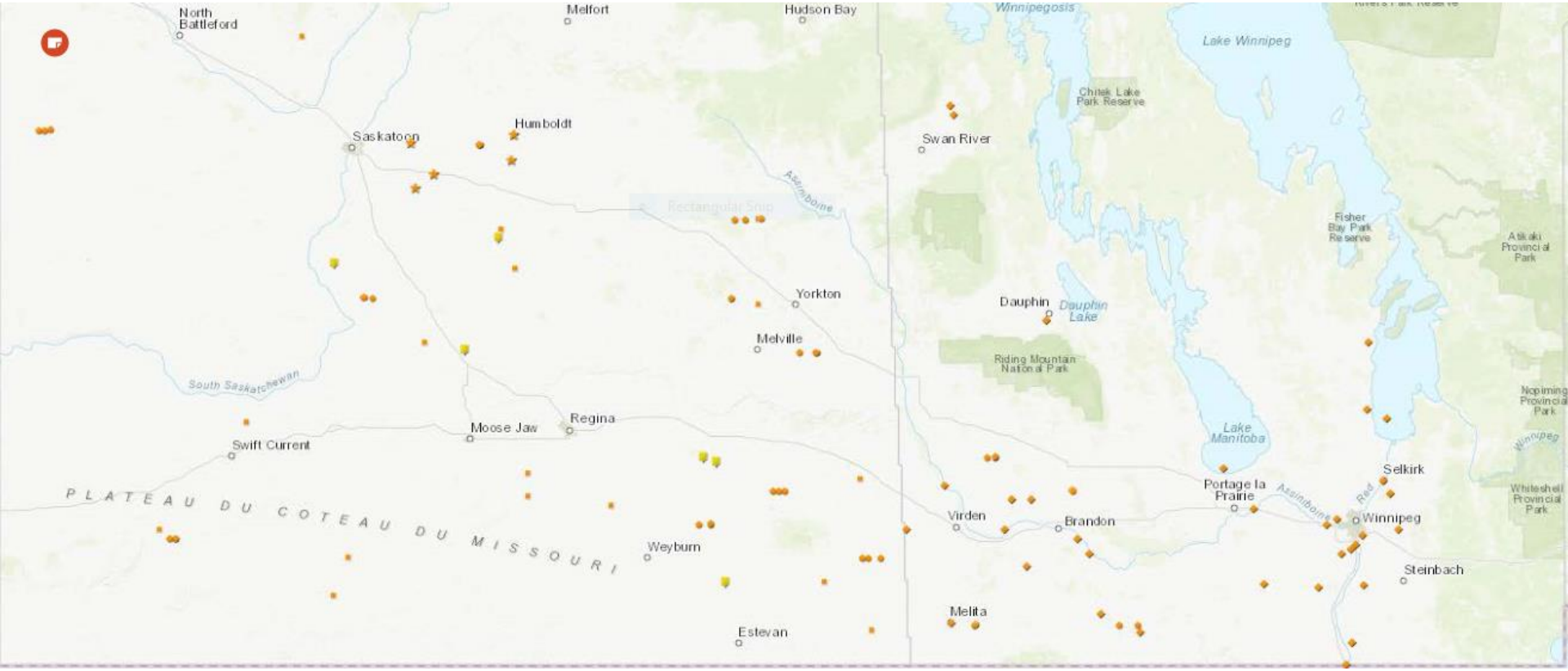
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Winnipegosis
Lake Winnipeg
Chitek Lake Park Reserve
Saskatoon
Humboldt
Swan River
Assiniboine
Rectangular Sup
Fisher Bay Park Reserve
Atikaki Provincial Park
Yorkton
Dauphin
Dauphin Lake
Melville
Riding Mountain National Park
South Saskatchewan
Nopiming Provincial Park
Regina
Moose Jaw
Swift Current
Lake Manitoba
Winnipeg
Selkirk
Portage la Prairie
Assiniboine
Red
Whiteshell Provincial Park
PLATEAU DU COTEAU DU MISSOURI
Virden
Brandon
Winnipeg
Weyburn
Steinbach
Melita
Estevan

Neonicotinoid Water Monitoring 2017

- Provincial and Canadian Grower Associations were instrumental in providing much of the funding. Multi-commodity approach.
- EMWG developed unified sampling protocol, sample storage, handling and shipping, sample preparation, analytical methods, detection limits, etc.
- GAP identified by PMRA – no data on crops planted and use patterns – addressed by extensive crop inventory data from AAFC, ECCC and Crop Insurance to determine cropping pattern and density around the waterway and wetlands.
- Registrants contributed funding, monitoring, expertise.

Neonicotinoid Water Monitoring 2017

- For flowing water systems (creeks, streams, rivers, irrigation canals), in the prairie provinces of Alberta, Saskatchewan and Manitoba (canola producing region), a total of 168 sites were monitored with analysis of 620 samples in 2017. Another 60 wetlands were monitored by DUC.

- Detection frequency and concentrations of imidacloprid, clothianidin and thiamethoxam were low, with majority being below the limits of detection. When detected, the insecticides were typically well below the chronic or acute endpoints established by PMRA for imidacloprid. By mid-end July the insecticides were no longer detectable.

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Neonicotinoid Water Monitoring 2017

- There are indications that all of the neonicotinoid insecticides above acute and chronic levels are from greenhouse or urban applications, and not from field crop use (i.e. seed treatments) but we are investigating this further. Best Management Practices can be implemented for greenhouses to reduce or eliminate insecticide accumulation in waterways.

- The data do not support any kind of restriction or ban on neonicotinoid seed treatment use, especially for field crops such as canola, pulses, cereal.

Neonicotinoid Water Monitoring 2018

- Repeat 2017 – imidacloprid, thiamethoxam, clothianidin
- Currently soliciting funding
- Early spring snow melt sampling critical
- Perhaps increased sampling following heavy rainfall events?
- Use Passive Samplers to monitoring flowing water over time in addition to point samples collected at various times throughout season?
- Again use georeferenced mapping to determine cropping patterns in watersheds

Neonicotinoid Water Monitoring 2018

- GOAL (similar to 2017):
  1. Provide PMRA and industry with multi-year season-long water samples in order to determine levels and persistence of neonic insecticides.
  2. Determine agriculture use patterns around the monitoring sites and along watersheds / wetlands.
  3. Determine impact of agriculture use patterns and density on acute and chronic levels of neonics. Can manage what you can measure!

Thank You!

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